

KEY

⑨ $p^{838} 3h''$ ⑩ 0 ⑪ $\frac{4}{3}$ ⑫ $\frac{4}{3}$

⑬ -2 ⑭ Not IRred ⑮ $a^4 b^2$ ⑯ $\pm 3x$

⑰ $\frac{1}{10}$ ⑱ $-d^2$ ⑲ $p^5 q^3 r^5 s^4$ ⑳ $(2x^2 - y^8)^2$

㉑ $\pm 4m^3 n$ ㉒ $-(2x - y)$ ㉓ $(r + s)$

⑤-6 1-31 odd

① $5\sqrt{3}$ ③ $3\sqrt[3]{3}$ ⑤ $7^2 xy^4 \sqrt[4]{xy^2}$

⑦ $3\sqrt{2} - 5\sqrt{2} - 2\sqrt{2}$ ⑨ $2\sqrt{3} \cdot 3\sqrt{3}$ ⑪ $\frac{\sqrt[3]{54} - \sqrt[3]{24}}{\sqrt[3]{27} - \sqrt[3]{2}}$
 $\frac{6 \cdot 3}{18}$

⑬ $-\sqrt{3}(2\sqrt{6} - \sqrt[3]{63})$
 $-2\sqrt{18} + 3\sqrt{21}$
 $-6\sqrt{2} + 3\sqrt{21}$

⑮ $(2 + \sqrt{5})(2 - \sqrt{5})$
 $4 - 5$
 -1

⑰ $(\sqrt{3} + \sqrt{2})(\sqrt{3} - \sqrt{2})$
 $3 - 2$
 1

⑲ $(1 - \sqrt{7})(4 + \sqrt{7})$
 $4 + \sqrt{7} - 4\sqrt{7} - 7$
 $-3 - 3\sqrt{7}$

㉑ $\frac{\sqrt{3m^3}}{\sqrt[3]{24n^3}} \cdot \frac{m\sqrt{m}}{2n^2\sqrt{2n}} \cdot \frac{\sqrt{2n}}{\sqrt{2n}} \cdot \frac{m\sqrt{2nm}}{4n^3}$

㉓ $2\sqrt[3]{\frac{rs}{2s^2t}} \cdot \frac{2r\sqrt[3]{r^2}}{\sqrt[3]{2s^2t}} \cdot \frac{\sqrt[3]{2^2st^2}}{\sqrt[3]{2^2st^2}} = \frac{2r\sqrt[3]{4r^2st^2}}{2st}$
 $\frac{r\sqrt[3]{4r^2st^2}}{st}$

$$(25) \sqrt[5]{\frac{32}{a^4}} = \frac{2}{\sqrt[5]{a^4}} \cdot \frac{\sqrt[5]{a}}{\sqrt[5]{a}} = \frac{2\sqrt[5]{a}}{a}$$

$$(27) \frac{5}{3-\sqrt{10}} \cdot \frac{3+\sqrt{10}}{3+\sqrt{10}} = \frac{15+5\sqrt{10}}{9-10} = -15-5\sqrt{10}$$

$$(29) \frac{-2+\sqrt{7}}{2+\sqrt{7}} \cdot \frac{2-\sqrt{7}}{2-\sqrt{7}} = \frac{-4+2\sqrt{7}+2\sqrt{7}-7}{4-7} = \frac{-11+4\sqrt{7}}{-3} \quad \text{OR} \quad \frac{11-4\sqrt{7}}{3}$$

$$(31) \frac{\sqrt{2}+\sqrt{3}}{\sqrt{2}-\sqrt{3}} \cdot \frac{\sqrt{2}+\sqrt{3}}{\sqrt{2}+\sqrt{3}} = \frac{2+2\sqrt{6}+3}{2-3} = \frac{5+2\sqrt{6}}{-1} = -5-2\sqrt{6}$$